WATER RESOURCES RESEARCH GRANT PROPOSAL

Project ID: 2005VI51B

Title: Qualification and quantification of human bacterial pathogens in UVI aquaculture systems

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Abstract

Water used in aquaculture systems can harbor bacterial pathogens that are of a concern to workers, consumers and the environment. Bacterial pathogens enter the system by birds and mammals that have access to the culture system. These pathogens include fecal coliform, fecal streptococci and Escherichia coli. Specifically, E. coli (E. coli 0157:H7) is the most important in terms of food borne illness. Fecal coliform level is used by public health officials to determine water safety for drinking and recreational water (USEPA 1986a, 1986b). The US Environmental Protection Agency (USEPA) standard for recreational waters is 150 total bacteria per ml. Safe bacterial counts for recreational use, which involves contact with the water, may be more restrictive than levels for fish culture where there is minimal contact by workers or the public. Recent effluent limitation guidelines for contained aquatic animal production facilities do not give limits for fecal coliforms but do include them in a list of conventional pollutants (USEPA, 2004).

UVI has developed outdoor aquaculture systems that intensify production and conserve water. It is likely that some bacterial pathogens exist in these systems but their levels are

unknown. The systems are a greenwater aquaculture system, and aquaponic system and a recirculating system.

This research will characterize bacterial pathogens as fecal coliform, fecal streptococci, and Escherichia coli and quantify the number present periodically over a 9-month period. This data will be compared with type and quantity of bacteria in other aquaculture systems in the United States and with other relevant environmental standards. This analysis will determine if the UVI systems contain similar levels of bacterial pathogens and if hazardous conditions exist in the culture water.